

## ABSTRACT

A method and apparatus of modeling a swept volume for a computer simulated object by generating a polyhedral representation of the object and representing motion of the object with a set of position matrices. A subset of free neighborhood entities can be determined for each matrix and traces of the motion of the free neighborhood entities can be generated. A representation of the swept volume from the traces is constructed. Free neighborhood entities can include for example, an edge or a triangle. A free neighborhood can be represented by an angular portion for different types of entities comprising the boundary of the polygon, a material zone represented by a half sphere containing material of the object and delimited by a plane of a triangle, or a free neighborhood including a tangent zone represented by two portions of a sphere, wherein the two portions of the sphere are delimited by planes of adjacent triangles.